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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/964,130	09/25/2001	Carl Milton Wildrick	AINNO.0101	9987

7590 07/02/2003

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EXAMINER

DINH, TUAN T

ART UNIT PAPER NUMBER

2827

DATE MAILED: 07/02/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/964,130

Applicant(s)

WILDRICK ET AL.

Examiner

Tuan T Dinh

Art Unit

2827

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 January 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2,4-12,14,17,18,29 and 30 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,4-12,14,17,18,29 and 30 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-2, 4-9, 11-12, 14, 17, and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Prior Art (PA, submitted by applicant) in view of Polcyn (U. S. Patent 4,395,585).

As to claims 1, 4-6, 8, 29, PA discloses a power module (100) and a method as shown in figures 1-4 comprising:

a FR4 board (110) formed from a plurality of layers (claims 4-6) having at least one element, which is a pair of planar magnetic cores (130, claim 8), mounted thereon; and

at least one or three interconnects (solder balls 240-figure 4) for electrically coupling the element to an end user's circuit card (10-figure 4).

PA does not teach the interconnects having U-shaped including a sidewall and a contact surface, the contact surface includes a through hole, the through hole adapted to allow solder paste to flow into the interconnects to form a strong physical bond between the element and the end user's circuit card.

Polcyn shows a spacer (8, column 2, line 29) capable of being an interconnect, the interconnect being formed U-shaped (see figures 3-4) having a sidewall (28; 30; 32; 34, column 2, lines 40-41) and a contact surface (10, column 2, line 30), the contact surface includes a through hole (12, column 2, line 31) disclosed in figures 1-5.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use a structure of the interconnect having a U-shape as taught by Polcyn to employ the power module and method of PA in order to provide a table against vibrating or other undesired movement of one board mounted to another board.

Regarding claims 2, 14, and 17, Polcyn shows the interconnect (8) made by conductive material (electrical insulative material, column 3, lines 38-40).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use a conductive interconnect as taught by Polcyn to employ the interconnect of PA in order to make electrical connection between boards.

As to claim 7, PA discloses a power module as shown in figures 1-4 wherein said board further comprises a surface for engagement with a pick and place machine (page 6, line 12).

As to claim 9, PA discloses a power module as shown in figures 1-4 wherein said board is stiffened by a metallic layer within the board.

As to claim 11, PA discloses a power module as shown in figures 1-4 wherein a solder paste is used to couple the interconnect to the end user circuit card.

As to claim 12, PA discloses a power module as shown in figures 1-4 wherein a thickness of said solder paste is greater than a combined tolerance of the board, the interconnect, and the end user circuit card.

3. Claims 10 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over PA in view of Polcyn ('585), and further in view of Hayashi et al. (U. S. Patent 5,969,952).

As to claims 10 and 30, PA and Polcyn do not teach said at least one interconnect comprises three interconnects that are placed to form a stable plane.

Hayashi shows in figures 1-3 comprising the interconnect having three interconnects that are placed to form a stable plane.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use three interconnects placed to form a stable plane in order to support to the power module as taught by PA and Polcyn, since it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art. *St. Regis Paper Co. v. Bemis Co.*, 193 USPQ 8.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use three interconnects as taught by Hayashi to employ the interconnect of PA and Polcyn in order to prevent stress or cause due to a deflection between boards.

4. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over PA in view of Polcyn ('585), and further in view of Schneider et al. (U. S. Patent 4,362,904).

As to claim 18, PA and Polcyn disclose all of the limitations of the claimed invention, except for the height of the first and second sidewalls within 2 mils each other, Schneider discloses the interconnect wherein the height of the first and second sidewalls are **within** 2 mils of each other.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have teaching's Schneider to employ the interconnect of PA and Polcyn for purpose of minimize space connected between two circuit boards.

Response to Arguments

5. Applicant's arguments with respect to claims 1-2, 4-12, 14, 17-18, and 29-30 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tuan T Dinh whose telephone number is 703-306-5856. The examiner can normally be reached on M-F.

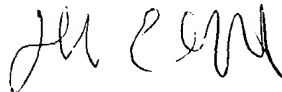
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David L. Talbott can be reached on 703-305-9883. The fax phone numbers for the organization where this application or proceeding is assigned are 703-305-1341 for regular communications and 703-305-1341 for After Final communications.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

TD
June 27, 2003.



DAVID E. GRAYBILL
PRIMARY EXAMINER